

the great orders of small and excessively active birds. The Passeriformes and Fringilliformes, with their allied orders, have an average temperature ranging from 42° to 44°.

Setting forth these results in a descending series, we find that:—

- (1) The higher birds range about 43° C. (109°·4 F.).
- (2) The middle birds range about 41° C. (105°·8 F.).
- (3) The lowest birds range about 39° C. (102°·2 F.).

But these observations in the Society's Gardens show that Apterix, the lowest order of all, is still lower in temperature, being only about 38° (100° F.).

The temperatures of the birds were all taken under uniform conditions, while the temperature of the air was between 55° and 63° F. And the result seems to bear out the contention, otherwise very probable, that the higher the bird in the zoological scale the higher in general is the temperature of its blood.

#### 4. On the American Spade-foot (*Scaphiopus solitarius* Holbrook). By G. A. BOULENGER, F.R.S.

[Received May 25, 1899.]

(Plate LII.)

Remarks recently made by Dr. T. Gill<sup>1</sup> on the position of *Scaphiopus* in the family *Pelobatidae* have induced me to make a detailed examination of the typical species of this genus, the osteological characters of which have not been fully described before. I was all the better prepared for this task, having had an opportunity of keeping and observing some living specimens, for which I am indebted to my friend Mr. A. Pam. These have enabled me to exhibit some figures of the animal carefully drawn and painted from life by Mr. P. Smit (see Plate LIII.), the figures previously given by Holbrook and by Duméril and Bibron being very unsatisfactory and taken from spirit-specimens. I had at my command a good supply of the latter, as well as two prepared skeletons; but of the eggs and larvæ nothing was at hand, nor did literature afford any information on this head. I had applied last summer to Messrs. Brimley, in North Carolina, where the Spade-foot is abundant, who kindly informed me that the eggs are laid early in spring, in strings resembling those of toads, but thicker and with the vitelline spheres more irregularly disposed—in fact, as I infer, not unlike those of *Pelobates*. They added that the season was then too far advanced for tadpoles to be procured, as their development is comparatively rapid, and the pools in which they are reared dry up by the end of spring. I have therefore to postpone a description of the tadpole, which I hope, however, to supply ere long.

<sup>1</sup> Science, (2) viii. 1898, p. 935.



F. J. Smith del. et lith.

SCAPHIOPUS SOLITARIUS.

Miner, Bros. Chromo.



Mr. C. S. Brimley writes from Rayleigh, N. Carolina, to the 'American Naturalist' (1896, p. 501):—"Last May I collected fifty breeding in a pool only a few yards from my house. In every case the grasp of the male was inguinal. The cry was not much louder than that of the common toad (*Bufo americanus*)."

The habits, so far as I have been able to observe them, are very similar to those of *Pelobates*. They burrow in the soil in exactly the same manner and come out only at night to feed. All my efforts to induce them to produce, when irritated, the loud cries so striking in *Pelobates* have failed. On the contrary, when teased, they assume a very humble appearance, bending down the head at an angle to the vertebral column and shutting the eyes in a manner which is well represented on the accompanying plate.

#### EXTERNAL CHARACTERS.

Vomerine teeth in two small, transverse or oblique groups on a level with the posterior border of the choanæ.

Tongue large, thick, circular, entire or feebly nicked and free behind.

Head large, convex, broader than long, with somewhat swollen occiput; crown and occiput rugose, the skin adhering to the bones; snout rounded, projecting slightly beyond the mouth; canthus rostralis rounded, lores very oblique; nostrils nearer the tip of the snout than the eyes, the distance between them half the width of the interorbital space, which exceeds the width of the upper eyelid; eye large, prominent, lateral; tympanum distinct, circular or vertically oval, two-thirds to three-fourths the diameter of the eye.

Fingers short, obtuse, third longest, first a little longer than second, fourth shortest; no subarticular tubercles; three round flat carpal tubercles forming a triangle, inner largest, at base of first finger, the two outer at the bases of the third and fourth fingers respectively.

Hind limbs robust and short, with swollen calves; the tibio-tarsal articulation reaches the shoulder or the tympanum; tibia shorter than the femur, the heels being widely separated from each other when the legs are folded at right angles to the rhachis. Foot longer than the tibia; toes short, obtuse, three-fourths or entirely webbed; no subarticular tubercles; a very large, compressed, sharp-edged inner metatarsal tubercle, longer than and in the axis of the inner toe.

Skin finely granulate or with small flat warts; black horny granules on the crown and occiput and on the warts of the body and limbs; a short, roundish or subtriangular, moderately prominent parotoid gland above the tympanum; lower parts smooth or feebly granulate; a roundish flat gland usually present on each side of the breast.

Brown or dark olive above, uniform or with more or less distinct darker marblings and often with a lyre-shaped pale brown or sulphur-yellow, dark-edged band on the back, the branches widest